AMENDMENTS TO THE CLAIMS

Claims 1-15 (Cancelled)

16. (Currently Amended) A flat-plate low-profile actuator, comprising:

a planar conductive polymer layer extending in a longitudinal direction;

~~an~~a first electrode in contact with the planar conductive polymer layer;

~~an opposite~~a second electrode disposed opposite to the first electrode; and

an electrolyte layer in contact with the planar conductive polymer layer, disposed in between the first electrode and the ~~opposite~~second electrode;~~,~~

~~the electrode being a planar electrode patterned to have at least one bent portion along a longitudinal direction that is an expansion and contraction direction of the conductive polymer layer so that rigidity in the longitudinal direction is low while rigidity in a width direction almost orthogonal to the longitudinal direction is high, the conductive polymer layer being deformed to be swelled and shrunken by application of electric fields to between both the electrodes~~

wherein the first electrode is planar and comprises at least one band-like portion and at least one link portion, each of the at least one link portion extending in the longitudinal direction, each of the at least one band-like portion extending in a direction perpendicular to the longitudinal direction, and each of the at least one link portion is shorter than each of the at least on band-like portion; and

wherein application of an electric potential between the first electrode and the second electrode deforms the planar conductive polymer layer such that the flat-plate low-profile actuator expands or contracts in the longitudinal direction.

17. (Currently Amended) The flat-plate low-profile actuator as defined in claim 16, wherein the first electrode is a zigzag-shaped planar electrode~~ having a plurality of bent portions along the longitudinal direction that is the expansion and contraction direction of the conductive polymer layer~~.

18. (Currently Amended) The flat-plate low-profile actuator as defined in claim 16, wherein

the first electrode is a planar electrode ~~comprising: a plurality of band-like portions along the width direction almost orthogonal to the longitudinal direction that is the expansion and contraction direction of the conductive polymer layer, and link portions along the longitudinal direction for linking the adjacent band-like portions,~~ the at least one band-like portion is a plurality of band-like portions, the at least one link portion is a plurality of link portions, and the plurality of link portions connect adjacent pairs of the band-like portions.

19. (Currently Amended) The flat-plate low-profile actuator as defined in claim 16, further comprising planar extension portions disposed on ~~both~~two sides of the first electrode in the longitudinal direction ~~that is the expansion and contraction direction of the conductive polymer layer~~, the planar extension portions ~~being used as force action portions~~being operable to transfer a force generated in the flat-plate low-profile actuator.

20. (Currently Amended) The flat-plate low-profile actuator as defined in claim 19, wherein the planar conductive polymer layer is ~~placed~~ disposed on ~~both~~ front and back surfaces of the first electrode, and a hole is ~~provided on the force action portion that is~~disposed in each of the extension portions ~~of the electrode~~ so as to link the front and back planar conductive polymer layers for reinforcement.

21. (Currently Amended) The flat-plate low-profile actuator as defined in claim 16, wherein the first electrode and the ~~opposite~~ second electrode ~~placed on the conductive polymer layer are stacked in such a way as to be alternately disposed~~ are disposed on alternate sides of the flat-plate low-profile actuator.

22. (Currently Amended) The flat-plate low-profile actuator as defined in claim 16, wherein the first electrode is a thin plate ~~made of: metal including gold, platinum, nickel, titanium, and stainless steel; alloy thereof; or carbon, or any one of these thin plates coated with these material groups or subjected to surface treatment such as chemical oxidation~~ having been subjected to a

surface treatment, or is a thin plate comprising a substance selected from a group consisting of carbon; gold; platinum; nickel; titanium; stainless steel; an alloy of gold; an alloy of platinum; an alloy of nickel; an alloy of titanium; and an alloy of stainless steel.

23. (Currently Amended) The flat-plate low-profile actuator as defined in claim 16, wherein the planar conductive polymer layer is composed of a pi-conjugated polymer with a substrate comprising a substance selected from a group consisting of polyaniline, polypyrrole, ~~or~~ polythiophene, a carbon dispersion conductive polymer, and ~~any one of~~ an organic conductive ~~polymers~~polymer which ~~are derivatives thereof~~ is a derivative of polyaniline, polypyrrole, or polythiophene~~, or a carbon dispersion conductive polymer~~.

24. (Previously Presented) The flat-plate low-profile actuator as defined in claim 16, wherein the electrolyte layer is a polymer gel or a polymer containing an ionic liquid.

25. (Currently Amended) The flat-plate low-profile actuator as defined in claim 16, wherein a ratio of a thickness of the planar conductive polymer layer to a thickness of the first electrode is not more than 3.

26. (Currently Amended) A flat-plate low-profile actuator, comprising:

a planar conductive polymer layer extending in a longitudinal direction;

~~an~~a first electrode in contact with the planar conductive polymer layer;

~~an opposite~~a second electrode opposite to the first electrode; and

an electrolyte layer in contact with the planar conductive polymer layer, disposed in between the first electrode and the ~~opposite~~ second electrode,

~~the electrode being a planar electrode patterned to have at least one bent portion along an output direction of drive force associated with expansion and contraction of the conductive polymer layer so that rigidity in the output direction is low while rigidity in a direction almost orthogonal to the output direction is high, the conductive polymer layer being deformed to be swelled and shrunken by application of electric fields to between both the electrodes so that the~~

~~drive force is outputted in the output direction~~

wherein the first electrode is planar and comprises at least one link portion extending in the longitudinal direction;

wherein the first electrode is disposed such that the flat-plate low-profile actuator is less rigid in the longitudinal direction than a direction orthogonal to the longitudinal direction; and

wherein the application of an electric potential between the first electrode and the second electrode deforms the planar conductive polymer layer such that the flat-plate low-profile actuator expands or contracts in the longitudinal direction.

27. - 30. (Canceled)

31. (New) The flat-plate low-profile actuator as defined in claim 16, wherein the first electrode is disposed such that the flat-plate low-profile actuator is less rigid in the longitudinal direction than a direction orthogonal to the longitudinal direction.

32. (New) The flat-plate low-profile actuator as defined in claim 16, wherein the planar conductive polymer layer has a first side extending in the longitudinal direction and a second side extending in the longitudinal direction; wherein the at least one band-like portion is a plurality of band-like portions, wherein the at least one link portion is a plurality of link portions, wherein the plurality of link portions connect adjacent band-like portions, and wherein the plurality of link portions alternate between being disposed on the first side and the second side such that the band-like portions and the link portions cumulatively form a zig-zag pattern.

33. (New) The flat-plate low-profile actuator as defined in claim 26, wherein the planar conductive polymer layer has a first side extending in the longitudinal direction and a second side extending in the longitudinal direction; wherein the first electrode comprises a plurality of band-like portions, wherein the at least one link portion is a plurality of link portions, wherein the plurality of link portions connect adjacent band-like portions, and wherein the plurality of link portions alternate between being disposed on the first side and the second side such that the

band-like portions and the link portions cumulatively form a zig-zag pattern.

34. (New) The flat-plate low-profile actuator as defined in claim 16, wherein the first electrode is a linear electrode.

35. (New) The flat-plate low-profile actuator as defined in claim 16, wherein the first electrode comprises a plurality of interconnected linear electrode elements.

36. (New) The flat-plate low-profile actuator as defined in claim 26, wherein the first electrode comprises a plurality of interconnected linear electrode elements.

37. (New) The flat-plate low-profile actuator as defined in claim 26, wherein the first electrode is a thin plate having been subjected to a surface treatment, or is a thin plate comprising a substance selected from a group consisting of carbon; gold; platinum; nickel; titanium; stainless steel; an allow of gold; an allow of platinum; an alloy of nickel; an alloy of titanium; and an alloy of stainless steel.

38. (New) The flat-plate low-profile actuator as defined in claim 26, wherein the planar conductive polymer layer is composed of a pi-conjugated polymer with a substrate comprising a substance selected from a group consisting of polyaniline, polypyrrole, polythiophene, a carbon dispersion conductive polymer, and an organic conductive polymer which is a derivative of polyanaline, polypyrrole, or polythiophene.

39. (New) A flat-plate low-profile actuator, comprising:

a planar conductive polymer layer extending in a longitudinal direction;

a first electrode in contact with the planar conductive polymer layer;

a second electrode opposite to the first electrode; and

an electrolyte layer in contact with the planar conductive polymer layer, disposed in

between the first electrode and the second electrode,

wherein the first electrode is disposed such that the flat-plate low-profile actuator is less rigid in the longitudinal direction than a direction orthogonal to the longitudinal direction; and

wherein the application of an electric potential between the first electrode and the second electrode deforms the planar conductive polymer layer such that the flat-plate low-profile actuator expands or contracts in the longitudinal direction.